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FAMOUS MINERAL LOCALITIES: BERYL HILL, GRAFTON, NEW HAMPSHIRE

GEORGE M. FLINT

Boston Society of Natural History

In the article in the December AMERICAN MINERALOGIST by Edward F. Holden, regarding the beryl locality at Beryl Mountain, South Acworth, New Hamsphire, it was mentioned that a crystal from that place on exhibition in the United States National Museum at Washington, is 12 dm. (48 in.) long by 4.5 dm. (18 in.) in diameter. In this connection it is of interest to note that the Boston Society of Natural History, at Boston, Mass., exhibits two unique beryl specimens (see Frontispiece), one a large matrix group of three crystals in pegmatite, weighing about 1,000 kg., which is probably not duplicated by any museum in the world.

The other specimen is a portion of a rude beryl crystal 8 dm. (32 in.) long by 9 dm. (36 in.) in diameter, showing roughly the prism *m*. Both specimens were collected at Beryl Hill, Grafton, New Hampshire, about 1856. For them we are indebted to Francis Alger, Esq., a former curator of the Society, who with great energy caused their removal first to his residence in Boston and, a few years later, to the Museum. This work required extreme care, not only because of the great weight (upwards of two and one half tons for the crystal), but on account of the extreme brittleness of the beryl. The difficulty of transportation from the quarry seemed, for a time, to preclude the removal of these specimens, but finally upon the arrival of winter, ox sleds were employed and they were taken out over the snow, and to this day it is a countryside story how the Boston man quarried and took away the enormous beryl crystal.

Hearing of a still larger crystal (five tons in weight) which was too large for transportation, Mr. Alger purchased Beryl Hill, in which it was located, and had the specimen developed by

drilling away the overlying quartz and feldspar, working on a large scale much as the ordinary collector does in his development of small cabinet specimens. Upon the completion of this work, Mr. Alger considered this beryl as one of the specimens in his collection and found pleasure in showing it to his friends, but the ravages of time and the hammers of collectors have done much to mar the value of this outdoor specimen.

The Grafton locality above mentioned is about 40 km. (25 m.) in an air line, northeast from the Acworth locality and is reached from South Danbury or Grafton stations of the Boston & Maine Railroad, about three and one half hours' run from Boston on the main line, between that point and White River Junction. The Grafton geology is essentially like that of Acworth, in that the beryls are in pegmatite, cutting metamorphic rocks, altho feldspar is more abundant at Grafton than at Acworth; it was this abundance which led to the opening of the Grafton pit, whose product, at one time, was exported to England.

Any information regarding the disposition of other large New Hampshire beryls would be of interest to the Boston Society of Natural History, and it is hoped that we may hear from readers of this note in regard to such specimens.

CRYSTALLOGRAPHY OF SOME CANADIAN MINERALS. STEPHANITE, EPIDOTE, AND CALAMINE[1]

EUGENE POITEVIN

Geological Survey of Canada

5. Stephanite, Drummond Mine, Ontario

The specimen which furnished the material for this note was obtained at the Drummond mine, Coleman township, Ontario, and was kindly loaned by Dr. R. Harvie. It consisted of a confused mass of calcite crystals holding in small cavities crystals of stephanite and pyrite, together with small quantities of wire silver and argentite. Thru the kindness of Dr. Harvie the writer was permitted to remove two small crystals of the stephanite for measurement. The crystal habit is tabular, the base, the brachypinacoid and the unit prism being well de-

[1] Published by permission of the Director of the Geological Survey of Canada. Contributions Nos. 1–4 appeared in the February number.

veloped. No evidences of the macropinacoid could be obtained, and the domes are all relatively small. The first crystal examined proved to be a twin. The second crystal examined proved to be a trilling, on the unit prism *o* (110) in each case.

The following forms were identified as occurring on these crystals:

TABLE 1. ANGLE TABLE FOR STEPHANITE, DRUMMOND MINE, ONTARIO

Forms observed on two measured crystals

Letter (Gdt.)	Symbol	Calculated		Measured	
		ϕ	ρ	ϕ	ρ
c	001	.....	0° 00′	.....	0° 00′
b	010	0° 00′	90° 00′	0° 00′	90° 00′
o	110	57° 49′	"	57° 49′	"
P·	111	"	52° 08′	"	52° 25′
h·	112	"	32° 45′	"	32° 49′
m·	113	"	23° 13′	"	23° 15′
r·	221	"	68° 46′	"	68° 25′
Q·	773	"	71° 34′	"	71° 19′
k	011	0° 00′	34° 25′	0° 00′	34° 29′
d	021	"	53° 52′	"	53° 59′
t	023	"	24° 33′	"	24° 29′
f·	133	27° 55′	37° 47′	27° 30′	37° 37′
v:	132	"	49° 18′	27° 46′	49° 40′

Stephanite had previously been reported from the Colonial mine in the same area, and crystals measured by Professor Victor Goldschmidt have been described.[1]

For purposes of comparison of crystals from the two mines the following table has been prepared.

TABLE 2. OCCURRENCE OF FORMS ON STEPHANITE, COBALT CAMP

Letter	Symbol	Localities		Letter	Symbol	Localities	
		Colonial Mine	Drummond Mine			Colonial Mine	Drummond Mine
c	001	x	x	*P*· ...	111	x	x
b	010	x	x	*r*· ...	221	x	x
o	110	x	x	*w*· ...	131	x	
π	130	x		*C*? ...	161	x	
t	023	x	x	*K*· ...	155	x	
k	011	x	x	*f*· ...	133	x	x
d	021	x	x	*ρ*: ...	241	x	
e	041	x		*v*: ...	132	x	x
c	102	x		*ϑ*: ...	152	x	
q·	114	x		*ω*: ...	134	x	
m·	113	x	x	*n*: ...	135	x	
h·	112	x	x	*Q*· ...	773		x

[1] *Rept. Ontario Bur. Mines*, **1913**, p. 25 (Cobalt-Nickel Arsenides and Silver Deposits of Timiscaming).

6. Epidote, White Horse Rapids, Yukon.

The specimens which furnished the material for this note were obtained from the vicinity of White Horse Rapids, Yukon. They consisted of a more or less intimate association of epidote, quartz, calcite, actinolite and tremolite and were found in connection with garnetiferous rock.

The greater part of the epidote assumes a crystalline-massive form, but here and there, particularly in contact with calcite and quartz, crystals eminently suitable for measurement are to be found. The largest of these latter measured 7 mm. in length and 5 mm. in width. Over fifty crystals were examined and a goodly number of these showed twinning along the direction of the ortho pinacoid t (100). Generally speaking the domes are found to be well developed, while the pyramids are small. Two new negative orthodomes ψ_0 ($\bar{8}03$) and ϕ_0 ($1\bar{5}.0.8$) were observed; both of these possessed good luster. Two new positive domes S_0 (104) and Σ_0 (504) were identified on three of the crystals. The general habits of the crystals are illustrated by orthographic projections, Figs. 3 and 4.

The following list indicates the forms observed:

Table 3. Angle Table for Epidote, White Horse, Yukon

New forms marked *

Letter	Symbol	Calculated		Measured	
		ϕ	ρ	ϕ	ρ
c	001	90° 00′	25° 24′	90° 00′	25° 25′
t	100	"	90° 00′	"	90° 00′
z	110	35° 00′	"	34° 55′	"
u	210	54° 28′	"	54° 16′	"
a	$\bar{2}01$	$\bar{9}0°$ 00′	64° 02′	$\bar{9}0°$ 00′	64° 06′
r	$\bar{1}01$	"	38° 18′	"	38° 22′
N	$\bar{3}04$	"	25° 20′	"	25° 32′
$*\psi_0$	$\bar{8}03$	"	70° 57′	"	70° 50′
$*\phi_0$	$1\bar{5}.0.8$	"	62° 12′	"	62° 43′
n	$\bar{1}11$	$\bar{2}3°$ 37′	63° 03′	$\bar{2}3°$ 36′	63° 24′
q	$\bar{2}21$	$\bar{2}9°$ 38′	76° 28′	$\bar{2}9°$ 37′	76° 47′
e	101	90° 00′	60° 06′	90° 00′	60° 09′
Θ	201	"	71° 35′	"	71° 31′
$*S_0$	104	"	38° 21′	"	38° 27′
$*\Sigma_0$	504	"	64° 03′	"	64° 09′

7. Calamine, Ainsworth, B. C.

The calamine crystals here described were collected by E. D. Ingall of the Geological Survey in 1892[1] at the Skyline Claim,

[1] *Geol. Surv. Can.*, N. S., **6**, 28K, 1892–93.

3.2 km. (2 miles) west-southwest from Ainsworth, West Kootenay district, British Columbia.

The crystals are small and tabular in habit and form radiating groups on the walls of cavities in a grayish-white cryptocrystalline quartz. They are sometimes associated with botryoidal malachite and are not infrequently thickly encrusted with this mineral. They are colorless and translucent, and under a low magnification the faces appear polished and smooth, but under higher magnification they show evidences of corrosion.

The general crystal habit is illustrated in orthographic and clinographic projection in Fig. 5; altho a large number of crystals were examined, only the following forms were identified: *a* (010); *e* (011); *s* (101); *t* (301); *p* (230) (Goldschmidt's notation).

The prism *p* (230) and the brachy pinacoid *a* (010) show vertical striations, and in the case of one very small crystal the orthodome *t* (301) could not be detected.

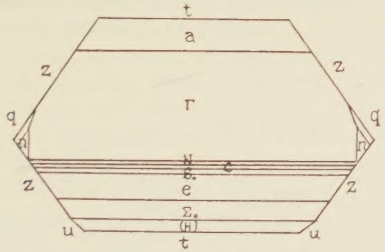
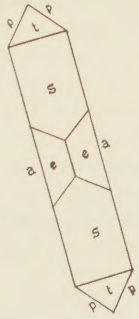


FIG. 3. Epidote, White Horse, showing new domes S_0 and Σ_0.



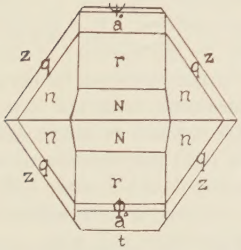


FIG. 4. Epidote, White Horse, showing new domes ψ_0 and φ_0.

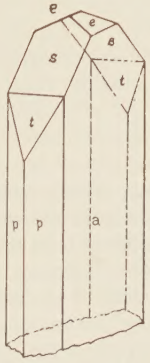


FIG. 5. Calamine, Ainsworth.

PROCEEDINGS OF SOCIETIES

PHILADELPHIA MINERALOGICAL SOCIETY

WAGNER FREE INSTITUTE OF SCIENCE, JANUARY 9, 1919

A stated meeting of the Philadelphia Mineralogical Society was held on the above date with the president, Dr. Leffmann, in the chair. Fourteen members and eight visitors were present.

Dr. Leffmann exhibited a piece of Shenandoah limestone from the vicinity of Conshohocken, and used in the foundation of the City Hall; also a Lumiere plate of a section of dolerite. Dr. Burgin exhibited a specimen of wulfenite obtained at Phoenixville in 1916.

Mr. Gordon reported a trip with Messrs. Trudell and Frankenfield to Lenni, where colorless chabazite was found.

Mr. Ford exhibited a fine California rubellite, and Mr. Oldach native silver from Cobalt, Ontario. Mr. Koch described a holder for box mounts under the microscope.

Messrs. J. C. Boyle and William Lee were nominated for membership.

The society then adjourned, for an exhibition of microscopic minerals.

SAMUEL G. GORDON, *Secretary*

BOOK REVIEW

A TEXT BOOK OF PRECIOUS STONES. FRANK B. WADE. G. P. Putnam's Sons, *New York*, 1918. 8vo, 318 pp. + 16 figs.

This book is addressed to jewelers and the gem-loving public. In directing his efforts to the first, the author undertakes a mission that has the approval of many.

Due to the novel treatment, and the emphasis laid on a knowledge of the fundamental physical characters of gems, it is believed that this book, well termed a text book, will fulfill its purpose of giving a basic knowledge of gem technology. Characterized by directness, and simplicity of description, the book will appeal especially to those without previous scientific training, and those limited by time—who must read as they run.

The use of expensive apparatus is avoided, all that is necessary being a specific gravity bottle, balance and a dichroscope. This is made possible by the simplicity of the tests, as illustrated by the method of determining if a mineral is doubly refracting where this is not apparent to the eye, or with a lens, by the doubling of the lines of the facets, as is the case with olivine, zircon, sphene, and epidote. The stone is exposed to direct sunlight, and the light reflected onto a white card; or the light may be passed thru the stone onto a card; if the gem is doubly refracting double images will appear of the facets, and the amount of refraction may be roughly determined by the relative displacement of the images, slight in aquamarine, and wide in zircon.

The text is divided into lessons describing the physical characters of stones: refraction, absorption, dichroism, specific gravity, luster, reflection, hardness,

dispersion, and color; emphasis being laid on specific distinctions; the whole described in untechnical language, with tables of the gems and their properties.

Following this come a number of lessons on the distinction of "scientific" from natural stones; how to test an unknown gem; the suitability of the gems for various types of jewelry; the mineral species to which gems belong; the naming of precious stones; how rough stones are cut; forms given to precious stones; imitations; artificial alteration of the color of precious stones; pearls: natural, cultured, and imitations; the use of the balance, and the unit of weight; tariff laws; an annotated bibliography and an index. S. G. G.

NOTES AND NEWS

On Saturday, December 21, the Anderson Galleries, of New York City, disposed by auction of a collection of minerals, numbering about 2,000 specimens, made by the late Thomas E. H. Curtis, of Plainfield, N. J. Mr. George S. Scott has kindly sent us the following account of this sale: "The collection was a large assortment of miscellaneous stuff, gathered in a haphazard manner, and in the whole collection there were probably less than one hundred specimens that were worth while. There may have been a couple of hundred more that were interesting. There were thirty or more bidders at the sale. If there had been sixty, the Curtis sale might have gone into history as the most successful sale of mineral specimens of the age. The bidding was robust, whether the specimen was good, fairly so or poor. Some claimed to have secured bargains, but there were very few bargains indeed in the better grade specimens, as the bidding on these got almost beyond control. The best purchase of the collection was a beautiful pyromorphite from Ems, bought by Mr. Whitlock for the American Museum of Natural History. Another worthwhile specimen was a pyrargyrite from Guanajuato, which was bought by Mr. English. A rhodochrosite and proustite represented item 331, on the Catalog list, as two vanadinites (from nowhere). The rhodochrosite was one of the Colorado kind, with large showy rhombohedrons. The proustite was a gem, a beautiful transparent crystal from Chili. The writer purchased these, also a stolzite from Broken Hill. The most active bidding of the sale was on some showy chalcotrichites, which brought double their actual specimen value. The following well-known mineralogists took part in the sale: F. J. Allen, G. E. Ashby, E. C. Dean, W. H. Broadwell, G. L. English, H. F. Gardner, J. C. Grenzi, C. W. Hoadley, J. Holzmann, O. T. Lee, W. G. Levison, J. G. Manchester, E. A. Maynard, E. Sampson, G. S. Scott, G. S. Stanton, J. Ulrich, J. P. Wintringham, and H. J. Young."

One of the positions mentioned in the January number of this magazine, which was that for a crystallographer with the Du Pont de Nemours Co., Wilmington, Del., has been filled by the appointment of Dr. Alfred C. Hawkins, recently Sergeant, First Class, in the Meteorological Section, Signal Corps, U. S. Army, the author of several contributions to this magazine. Other positions are still open.

Thru a misunderstanding the frontispiece of the January number was labeled at the bottom instead of at the side. The views will be found to stand out better if viewed with what is now the right-hand side made the bottom.

NEW MINERALS

RACEWINITE

A. N. Winchell; Racewinite, a peculiar mineral from ore deposits in Utah. *Econ. Geol.*, **13**, (8), 611–615, 1918.

NAME, derived by a rather novel method: From Racewin, the *cable address* of H. V. Winchell, who discovered the mineral.

PHYSICAL PROPERTIES

Color: brown to yellow in thin splinters, nearly black in mass; bluish green on fresh fractures. Luster: dull to bright. Form: coarsely crystalline, with no visible cleavages or crystal faces; marked conchoidal fracture. H. = 2.5, rather fragile. Sp. gr. = 1.94–1.98.

OPTICAL PROPERTIES

Mean n about 1.51, birefringence comparable with quartz, optically —, biaxial with a large optic axial angle.

CHEMICAL PROPERTIES

Analyses: 1. Philip J. Hickey, 2. Charles L. Austin.

	1.	2.
SiO_2	43.92	43.24
Al_2O_3	23.68	23.69
Fe_2O_3(+ FeO)	7.37	8.05
MgO	0.50	0.78
CaO	2.52	2.42
H_2O	22.04	21.80
	100.03	99.98

A large amount of H_2O can be driven off by heating, without destroying the crystal structure, or materially altering the optical properties. H_2O is also lost by exposure to dry air and rapidly over H_2SO_4. The mineral adheres to the tongue. In water it slacks or breaks to small pieces.

A freshly broken green piece changed slowly to brownish black. In boiling HNO_3 insoluble, but the color changes to a translucent brownish yellow, probably due to extraction of iron. Unchanged and unattacked by H_2SO_4; slowly soluble in HCl. The fine powder is nearly white, but on dipping in oil of cloves the color changes to green and black, probably due to oxidation of ferrous iron present. It is suggested that the iron, like the water, may be present in solid solution.

OCCURRENCE

Obtained at the Highland Boy mine, Bingham, Utah, where it occurs in veins and irregular masses with pyrite and other ore minerals, in limestone, apparently one of the latest products of hydrothermal alteration of the limestone.

S. G. G.

ABSTRACTS OF MINERALOGIC LITERATURE

A NEW OXYCHLORIDE OF TIN. HARRY F. KELLER. *J. Am. Chem. Soc.*, **39**, 2354–2356, 1917.

Minute crystals from a metallic mass found in an aboriginal cemetery were analyzed and seemed to have the formula $SnO.SnCl_2$. E. T. W.

RHYTHMIC DEPOSITION OF FLINT. G. A. J. COLE. *Geol. Mag.* [6], **4**, 64–68, 1917.

The rhythmic banding shown by certain flints is suggested to be due to the intermittent action of circulating waters. E. T. W.

DIARSENIDES AS SILVER PRECIPITANTS. CHASE PALMER. *Econ. Geol.*, **12**, 207–218, 1917.

The action of smaltite, loellingite, safflorite, maucherite and niccolite on silver sulfate solutions was studied. All of these precipitate metallic silver, while other disulfide and diarsenide minerals fail to do so. E. T. W.

THE BISMUTH MINERALS OF THE TRANSBAIKALIA. K. A. NENADKEVICH. *Bull. acad. sci. Petrograd*, **7**, 447–454, 1817; thru. *Chem. Abstr.*, **11**, 3205, 1917.

A number of occurrences of bismuth minerals, principally carbonates, are described. The chemical features, and extraction of the metal, are emphasized most. One sample, representing the cement between crystals of beryl, from the Sherlov mountains, is thought to be new, analysis showing its formula to be $2Bi_2O_3.CO_2.H_2O$. After dissolving in acid a black powder in minute amount remained, which is considered to be BiO, also a new mineral. The physical properties and homogeneity of these materials are not, however, discussed. E. T. W.

A MICROSCOPIC STUDY OF THE SILVER ORES AND THEIR ASSOCIATED MINERALS. F. N. GUILD. *Econ. Geol.*, **12**, 297–353, 1917.

A detailed mineralographic study, including new microchemical tests. The paragenetic sequence of the minerals is worked out. E. T. W.

THE CRYSTAL STRUCTURE OF MAGNESIUM. A. W. HULL. *Proc. Nat. Acad. Sci.*, **3**, 470–473, 1917.

By the author's method magnesium has been found to have the atoms in nearly the theoretical close-packed hexagonal arrangement, with a very slight shortening along the vertical axis. E. T. W.

THE MESOSIDERITE-GRAHAMITE GROUP OF METEORITES; WITH ANALYSES OF VACA MUERTA, HAINHOLZ, SIMONDIUM, AND POWDER MILL CREEK. G. T. PRIOR. *Mineral. Mag.*, **18**, (85), 151–172, 1918.

The author concludes that no real distinction can be drawn between the so-called mesosiderites and grahamites, here believed to be due to a mixture of a eucritic and a pallasitic magma. S. G. G.

THE CHEMICAL COMPOSITION OF THE METEORITES AMANA (= HOMESTEAD) AND EAGLE STATION. G. T. Prior. *Mineral. Mag.*, **18**, (85), 173–179, 1918.

Analyses are given with discussion of the composition and their position in the author's genetic classification. S. G. G.

THE RELATION BETWEEN DIFFERENT LAWS OF TWINNING THAT RESULT IN THE SAME TWIN-CRYSTAL. John W. Evans. *Mineral. Mag.*, **18**, (85), 224–243, 1918.

CHANGING THE PLANE OF A GNOMONIC OR STEREOGRAPHIC PROJECTION. Harold Hilton. *Mineral. Mag.*, **18**, (85), 244–247, 1918.

CLEAVAGE-ANGLE IN A RANDOM SECTION OF A CRYSTAL. Harold Hilton. *Mineral. Mag.*, **18**, (85), 248–251, 1918.

A graphical solution of the limits assignable to the cleavage angle of a mineral exhibited in a random section. S. G. G.

LATTICE-LIKE INCLUSIONS IN CALCITE FROM NORTH BURGESS, ONTARIO. R. P. D. Graham. *Mineral. Mag.*, **18**, (85), 252–258, 1918.

A description of pale blue calcite containing remarkable lattice-like needle inclusions of a hydrous magnesium silicate. The lattice has the shape of the negative obtuse rhombohedron e $(01\bar{1}2)$. An analysis is given, and the origin of the mineral discussed. S. G. G.

A NEW SILICATE OF LEAD AND ZINC. P. A. van der Meulen. *Trans. Am. Inst. Min. Eng.*, **58**, 369–371, 1918.

An artificial furnace product from Austinville, Va., showed colorless to light yellow crystals in cavities in a yellowish slag. These proved to be orthorhombic, prismatic; H. = 5 or 6; Sp. gr. = 6.153; composition: $R''_5\,Si_2O_9$, R'' = Pb, Zn. An analysis is given. S. G. G.

GEMS AND PRECIOUS STONES IN 1917. Waldemar T. Schaller. Mineral Resources of the United States, 1917, II, 145–168, 1918.

Statistics are given of the gem production in 1917. The report is chiefly devoted, however, to an alfabetical list of gem names and their corresponding mineral names. S. G. G.

PYROLUSITE FROM VIRGINIA. Thomas L. Watson and Edgar T. Wherry. *J. Wash. Acad. Sci.*, **8**, (16), 550–560, 1918.

Crystals of pyrolusite occur abundantly at Powells Fort, on northeast Massanutten Mt., 6 miles northeast of Woodstock, Shenandoah Co., Va., in a deposit of the mineral in Oriskany conglomerate, as a replacement of the rock, cement and breccia filling. The physical properties and 2 analyses show the crystals to be pyrolusite, and they may represent pseudomorphs after manganite, or possibly original pyrolusite. The crystals average 1 mm. across, with a tabular to wedge-shaped habit, the latter due to an unequal development of the attached faces, giving the crystals a pseudo-hemimorphic character. $a : b : c = 0.8616 : 1 : 0.5628$, corresponding to some occurrences of manganite. Twenty forms were observed, the following new: A (018), B (014), C (013), D (012), F (032), Z (566), and X (654). S. G. G.

PLATE 4.

FIG. 1. PYRITE CRYSTAL ON LIMESTONE.
Collection of Mr. James G. Manchester.

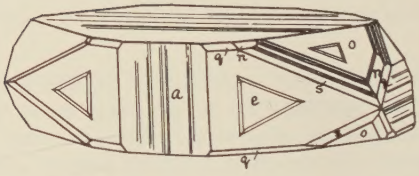


FIG. 2. DIAGRAM OF PYRITE CRYSTAL.
For description see page 31.

PYRITE FROM BROADWAY AND 207TH STREET, NEW YORK CITY.